ORIGINAL ARTICLE

Osteolytic Skull Lesions Rare but Important Pathology in Neurosurgical Department

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ABSTRACT

Objective: *To present an overview of varied clinical presentations, investigations and treatment options for Osteolytic skull lesions.*

Study Design: *It was a retrospective and prospective study.*

Materials and Methods: *Between Jan 2011 __ Feb 2014 during a period of 3 years. Twelve patients presented in neurosurgical OPD Lahore General Hospital. All patients were thoroughly investigated with appropriate hematological and radiological investigations. All were followed regularly in OPD. Outcome was defined as Excellent, moderate and poor according to complete or partial remission and recurrence of disease.*

Results: *Total 12 patients were included in the study. Amongst these 7 were male and 5 female. Age group of patients ranged from 6 months to 80 years. Majority of these were in younger age group. Of these 3 cases were each of Tuberculosis and malignancies, 2 midline benign lesions and 1 each of post traumatic, infection and metastasis. All underwent diagnostic / therapeutic procedures and referred for Radio or chemotherapy where indicated.*

Conclusion: *All scalp / skull lesions need careful clinical correlation, appropriate radiological investigations to establish diagnosis and subject them to suitable treatment.*

Key words: *Osteolytic = Skull lesions.*

INTRODUCTION

Osteolytic skull lesions are a rare entity among neurosurgical patients. Constitute about 1% of all skull tumors'. Differential diagnosis is broad and includes both benign and malignant lesions. Majority of these are benign and usually present as an enlarging soft or hard mass over the skull with or without tenderness. Although there is a list of these lesions, broadly categorized into congenital, traumatic, inflammatory and neoplastic lesions.[1]

Although we are unable to retrieve exact data for incidence of these lesions but broadly entities encountered are:

In children and young adults include Eosinophilic granuloma, Encephaloceles, Epidermoid / Dermoid, Osteoblastoma, Hemangioma and Aneurysmal bone cyst.[2]

In adults Metastasis and Multiple myeloma are mainstay diagnosis. In adults especially a source for primary lesion elsewhere should always be searched with the suspicion of metastasis. While Fibrous dysplasias, surgical defects, Lymphomas, Intraosseous meningiomas, Sarcomas and intracranial tumor with erosion of skull are rare but yet other important lytic lesions. It should take simple investigations like plain skull X-rays and CT scans to commence with and then do sophisticated tests like MRIs, MRS, MRV and bone scan as required.[3]

MATERIALS AND METHODS

We conducted a retrospective study from Jan 2011 __ Feb 2014 during a period of 3 years at Department of Neurosurgery Post Graduate Medical Institute and

Ameer-ud-Din Medical College / Lahore General Hospital, Lahore. During this time 12 patients presented with Osteolytic skull lesions through OPD. Bio data, Investigation and Treatment record and details of follow-up visits was retrieved .Current status of patients was assessed from follow-up clinic or on telephone.

Sex Incidence

These were 8 (67%) male and 4 (33%) female and the lesions were more common in males.

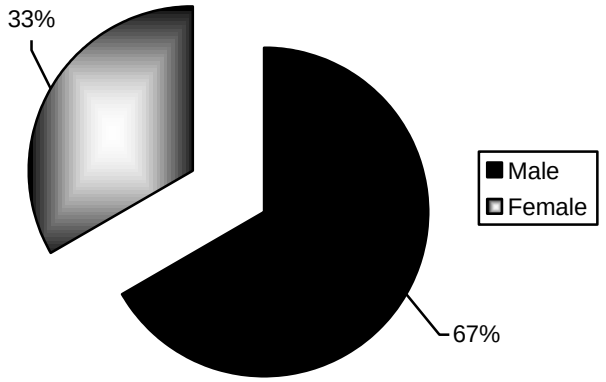


Fig. 1: *Sex Incidence.*

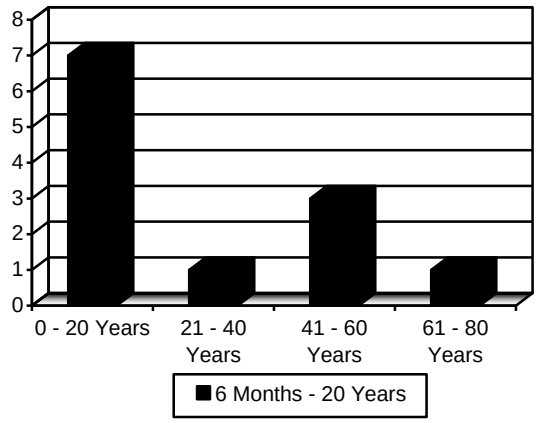


Fig. 2: *Age Range.*

Table 1: *Age Range.*

Age	Number	Percentage
0 – 20	7	58.3
21 – 40	1	8.3
41 – 60	3	25.1
61 – 80	1	8.3
Total	12	100

Gender and Age Group

Age group range of the patients in this study was wide (6 months __ 80 years) and the lesions were more common in males.

Inclusion and Exclusion Criteria

Patients of all ages and both genders were included in study. Only those patients with defined lytic lesions on radiology with established histopathological diagnosis were studied. Patients who lost follow-up were excluded.

RESULTS

Disease pattern in these patients included Tuberculosis (with particular predisposition for poor socioeconomic class) malignancies, midline Dermoid and Epidermoid and a case of thyroid metastasis.

Patient Outcome

It was defined in terms of Excellent, Good and poor. As below;

Excellent; Complete remission of symptoms with no residual pathology on follow-up radiology.

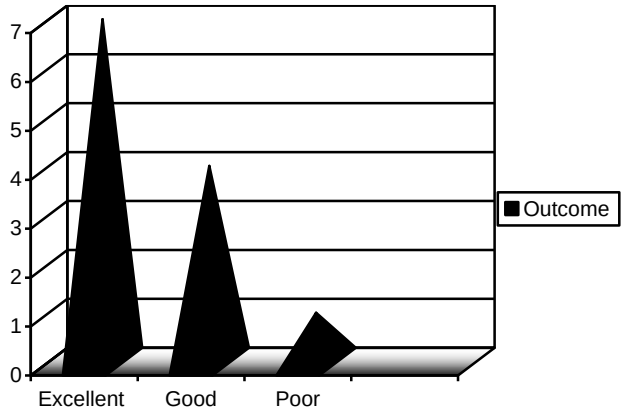


Fig. 3: *Outcome.*

Table 3: *Outcome.*

Outcome	Number	Percentage
Excellent	7	58.3
Good	4	33.3
Poor	1	8.3
Total	12	100

Good; > 50% resolution of initial symptoms as narrated by the patients themselves with / without adjuvant radio or chemotherapy.
Poor; Recurrence of disease

In our series, 7 (58.3%) patients had excellent outcome, 4 (33.3%) had good and 1 (8.3%) poor outcome.

Operative Procedures

Two patients with Epidermoid / Dermoid had encapsulated excision. Of the 3 patients with malignancies Gross total (extraconal and extradural) excision was achieved in 8 year old female child with swelling over Right eyelid and forehead (biopsy proven Spindle cell sarcoma) and referred for Radiotherapy ; Incisional biopsy was done in rest of 2 cases (owing to advanced age and co-morbidities in one case and to multiplicity of lesions in the other case) 3 patients had calvarial tuberculosis of which 2 presented with discharging sinus and 1 had Right supraorbital swelling. Skin margings were debrided and sinus completely excised along with curettage of involved bone in the 1st two cases while supraorbital craniotomy approach was used in the 3rd case with removal of granulation tissue. All three received full course of antituberculous chemotherapy. A 50 year old male who presented with painful swelling back of head underwent sub-occipital craniectomy and excision of extradural intraosseous abscess followed by IV antibiotics with complete resolution of symptomatology. One patient with Left parietal (skull lytic) meningioma had craniectomy around the lesion with subsequent complete excision of tumor. In our study an 80 year old lady with negative metastatic workup had Left parietal swelling for a year which was excised completely under G/A. Her biopsy yielded Metastatic thyroid (follicular Ca) and patient was referred postop to Gen surgeon and oncologist as Thyroid scan revealed cold nodule. A 6 month old child with Occipital encephalocele had excision of the swelling with repair of underlying dural defect.

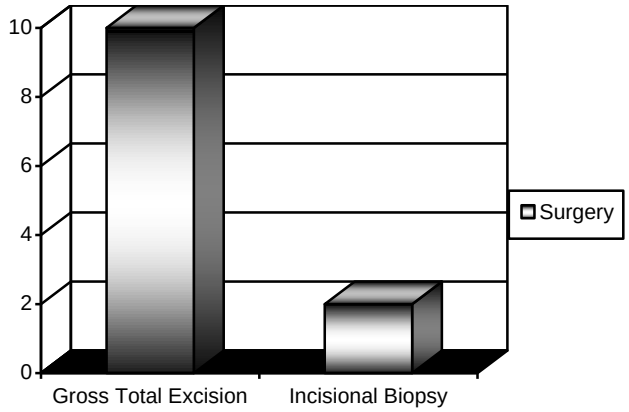


Fig. 4: *Surgical Procedure.*

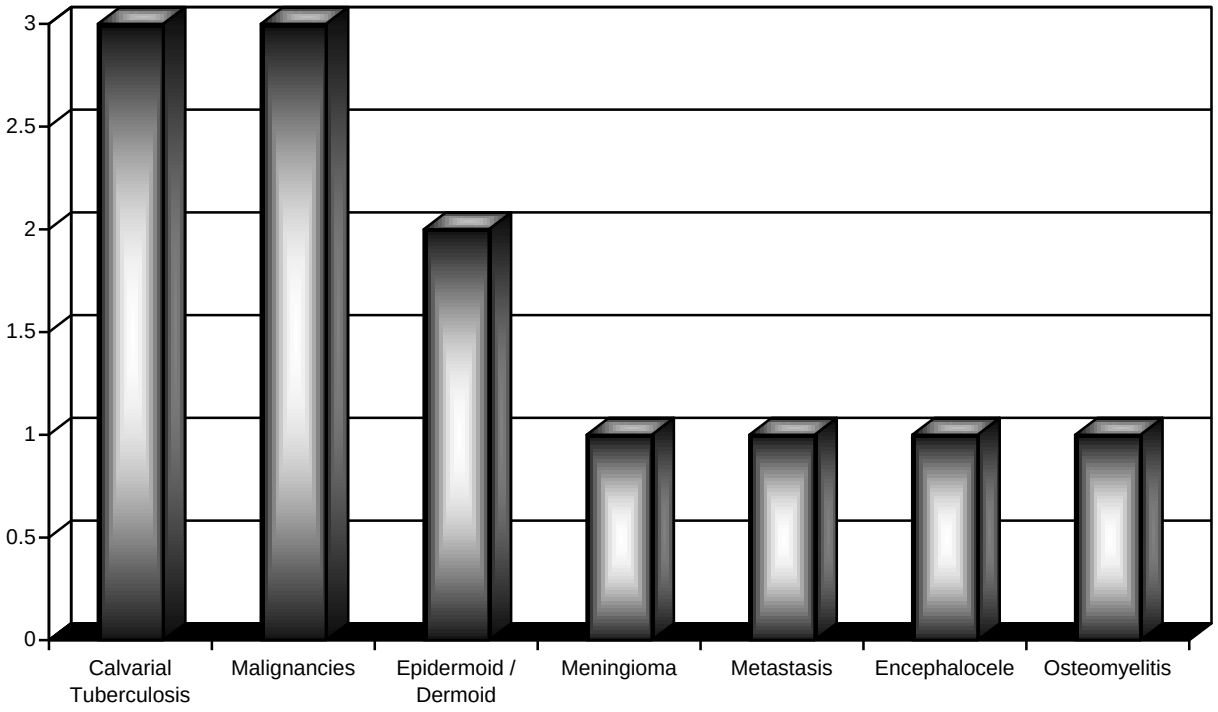
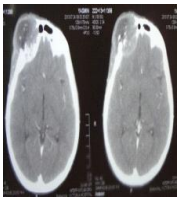
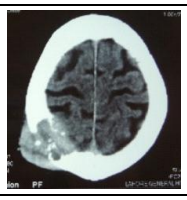


Fig. 6: *Histopathology.*

Gender	Age	Clinical presentation	Radiology	Surgery / Intervention	Histo-pathology	Follow-up	Outcome
♂	6 months	Swelling over Occiput	Encephalocele	Excision + Repair of occipital Encephalocele	Ence-phalocele	3 years	Excellent
♂	2 years	Midline swelling front of scalp	Extradural frontal swelling	Encapsulated excision	Epidermoid cyst	10 months	Excellent
♀	3 years	Swelling over Anterior fontanela	Extradural frontal swelling in midline	Total Excision	Dermoid cyst	1 year	Excellent
♀	8 years	Swelling over Right eyelid and forehead		Gross total (Extraconal and extradural) excision done	Spindle cell sarcoma (high grade)	6 months	Good On radiotherapy
♀	11 years	Painless papule with pus discharge from left forehead	Osteomyelitis of skull	Excision of sinus and bone debridement done	Calvarial Tuberculosis	10 months	Excellent On anti-tuberculous therapy
♂	14 years	Right eye swelling ; Headache; Diplopia		Supraorbital approach and removal of granulation tissue from superolateral aspect of orbit	Tuberculous granuloma	2 years	Excellent; Completed ATT
♂	14 years	Multiple swellings over scalp with spontaneous regressions	Osteolytic skull lesion	Biopsy of the lesions taken ; Referred to oncologist	Round blue cell tumor	5 months	Good Referred to Oncologist
♂	25 years	Small discharging sinus Right supraorbital region		Supraorbital approach and removal of granulation tissue	Tuberculous granuloma	22 months	Excellent ; Completed ATT
♀	45 years	Swelling left side head ; Headache; Fits		Craniectomy around the lesion and removal of tumor over the dura	Meningioma	3 years 6 months	Excellent for 3 years then had recurrence
♂	50 years	Severe pain back of head with swelling		Suboccipital midline Craniectomy and evacuation of extradural abscess	Osteo-myelitis	9 months	Excellent

♂	60 years	Swelling over Occiput with headache		Biopsy of the lesion; Referral to oncologist	Spindle cell tumor	8 months	Poor
♀	80 years	Painful Swelling over Right side of head		Complete excision of the lesion done; Referral to General surgeon	**Metastatic thyroid (Follicular) CA**	8 months	Good

DISCUSSION

Significant number of patients present in OPD with swelling over scalp. Although a lot of these are benign lesions like sebaceous cysts, lipoma. But careful evaluation is mandated for immobile or hard swellings keeping in mind their extension to skull table or dura.[1] In our series we had 12 such patients. Two patients from pediatric age group had midline swellings, one Dermoid and the other Epidermoid, wherein we did encapsulated excision with no recurrence.[2]

Calvarial tuberculosis is rare in western literature but Pakistan being 5th amongst TB burden countries worldwide and with 420000 cases per year; its incidence is not uncommon in Pakistani population of patients in our study had skull tuberculosis, 2 involving the orbit and 1 left Frontal bone. Two of these presented with discharging sinus and 1 had eye swelling with diplopia. In orbital cases Supraorbital approach was employed with debridement of granulation tissue; while 3rd case had discharging wound left side of forehead for which complete excision of the sinus was done. All three received antituberculous chemotherapy with regular follow-up.

In one previous study by Abhijit et al from AJNR, there were 42 patients with calvarial tuberculosis (28 male and 14 female) where they did surgical debridement in 28 and FNAC in 14, all receiving antituberculous chemotherapy and showed complete resolution over a period of 2 years.

Three patients in our study had malignancy. 2 had Spindle cell neoplasm, 1 (one 8 year old and other 60 year old). Female child presented with Right eye proptosis and swelling extension to right side forehead. Gross total (extraconal and extradural) excision of tumor was done and was referred for radiotherapy, while 60 year old age patient had headache along with firm swelling over occiput. Because of co-morbidities, we could only do biopsy of the lesion under local anesthesia and subjecting to radiotherapy. One teenage patient had multiple swellings over scalp with relapsing and remitting course Biopsy turned out Round blue cell tumor and patient was referred to oncologist.

One 45 year old male presented with severe pain back of head with tender swelling over occiput. On 1st available list sub-occipital craniectomy and evacuation of extradural abscess was done. In literature there are reports of Osteomyelitis of frontal bone secondary to Syphilis and of skull base secondary to penetrating scalp injury. Common etiologies include trauma, bone surgery, bacteremia, contiguous infection focus and systemic infection.

An eighty years old lady presented with painful swelling over right parietal region for a year. Our provisional diagnosis was Metastasis vs. multiple myeloma. However systemic workup was unrevealing. Complete excision of the lesion was done under general anesthesia. Peroperatively it was profusely bleeding soft to firm tumor and histopathology report was metastasis with thyroid follicular tissue. Subsequently her thyroid scan revealed cold nodule and patient was referred to general surgeon for further treatment.

Previous studies by Wong GK et al, Houra K. et al and M. Shehzad Shamim report cases of skull mets secondary to Thyroid carcinomas (Papillary in young and Follicular in adults) wherein they did complete surgical excision of tumor along with involved dura in one case and preop embolization was done in another case where they had established diagnosis of thyroid tumor.

One patient had Left firm scalp swelling along with headache and fits for which craniectomy was done around the lesion and complete removal of tumor was done along with part attached to dura. Biopsy report was meningioma (intraosseous).This patient remained symptom free for 3 years and then had recurrence of swelling. Nil. Tokgoz et al recommend total

tumor removal with wide surgical resection followed by cranial reconstruction as treatment of choice for symptomatic primary intra-osseous meningiomas.

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